

**U.S. DEPARTMENT OF COMMERCE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
NATIONAL WEATHER SERVICE  
NATIONAL METEOROLOGICAL CENTER**

**OFFICE NOTE 8**

**BAROTROPIC ERRORS VERSUS MOMENTUM EXCHANGE**

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**This is an unreviewed manuscript, primarily intended for informal  
exchange of information among NMC staff members**

Office Note No. 8

Joint Numerical Weather Prediction Unit

Barotropic Errors  
versus  
Momentum Exchange

November 26, 1957

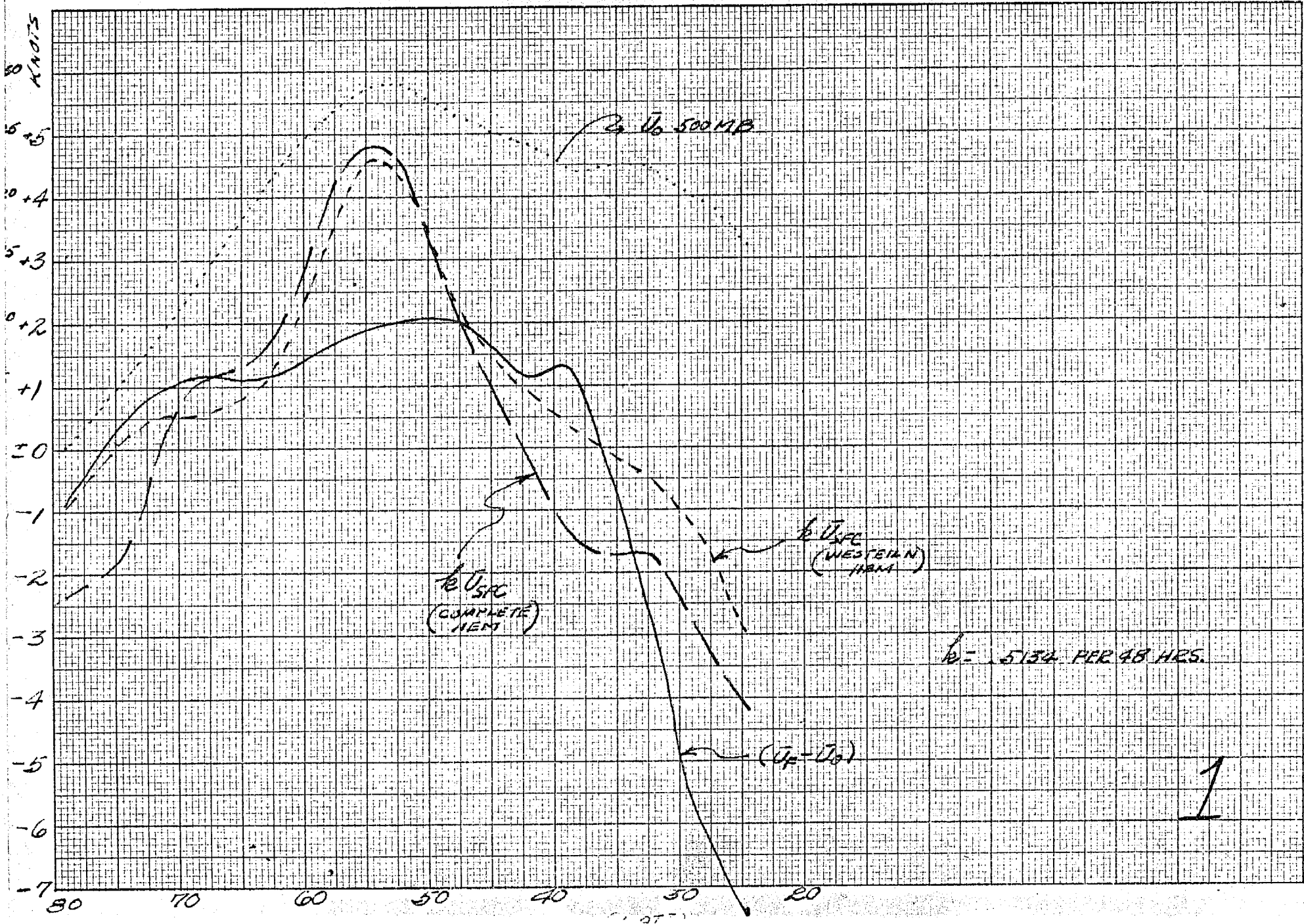
The charts which follow are the results of some evaluations of the barotropic 48 hour zonal wind errors versus a momentum exchange parameter suggested by Professor N.A. Phillips during his recent visit. The momentum parameter consists of a coefficient ( $k$ ) multiplied by the zonal surface wind at the latitude of the corresponding 500 mb zonal wind error. All of the following charts are plots of the 500 mb zonal wind error (solid line) in knots as a function of latitude along with the above mentioned momentum parameter (dashed line).

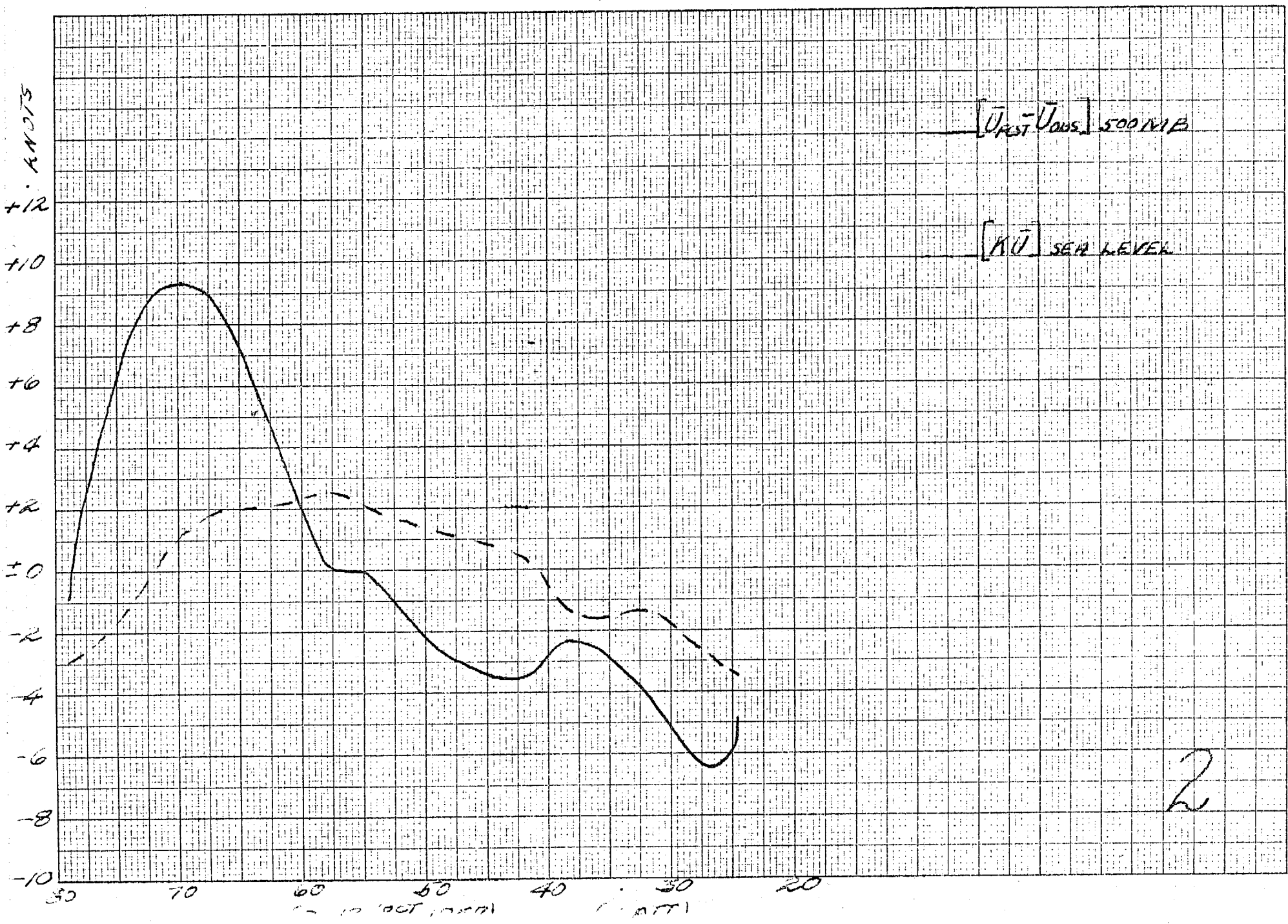
Chart 1 indicates the October 1957 average 500 mb zonal wind error and the momentum parameter using the corresponding mean surface chart.

Charts 2 and 3 are similar comparisons for 5-day mean charts for periods having fairly homogeneous error patterns. In these two instances the mean surface charts were comprised of the five median surface charts of the 48 hour forecast periods. If one discounts the relatively small geographical region north of 65 North, the comparison in figure 3 is quite good whereas figure 2 is rather neutral.

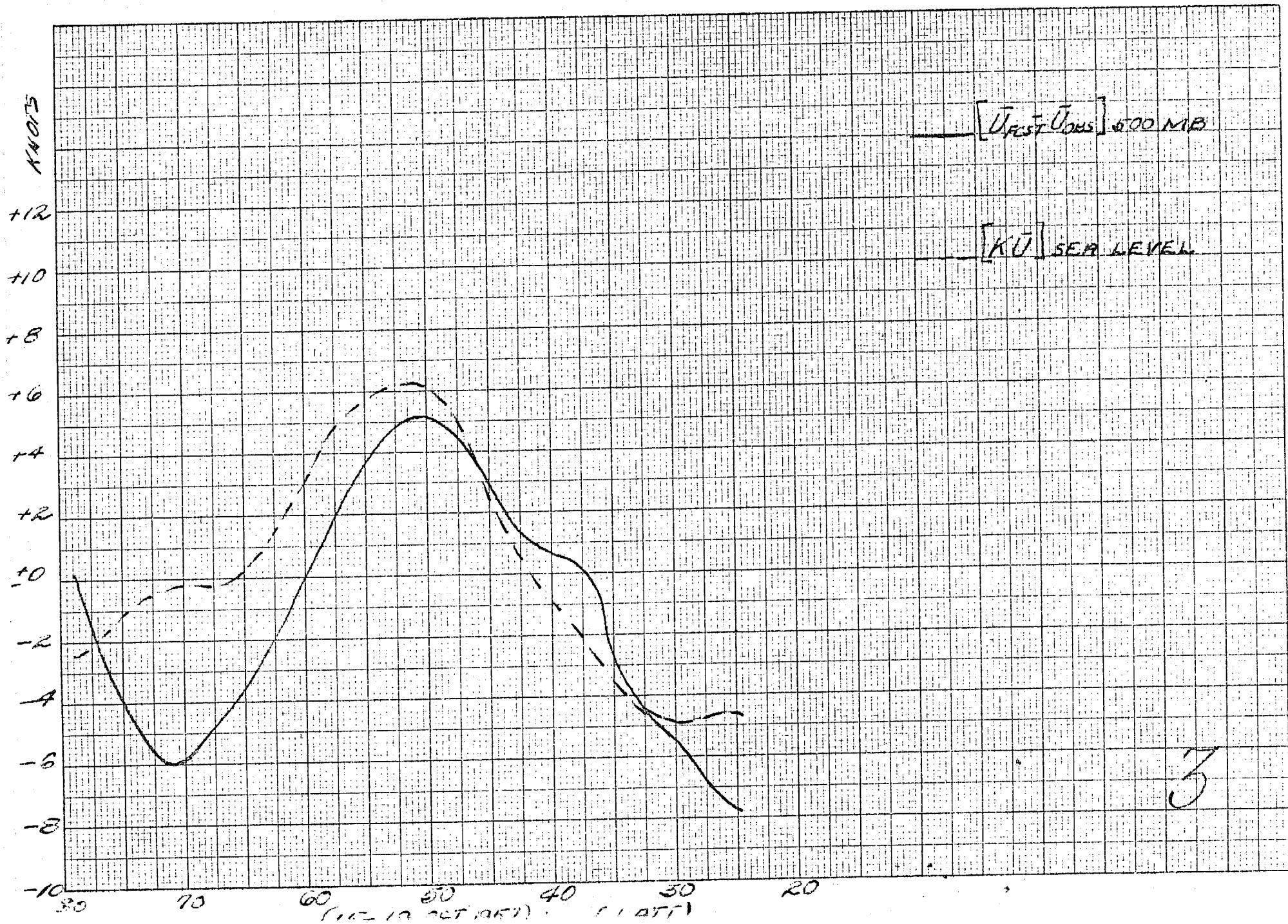
Next, the same comparison was made for 5 individual days - two of these in the two 5-day mean cases and three others on days with no large systematic zonal wind errors. These cases for individual days were treated in a practical manner by using the surface map which would be available at the starting time. Of these five, the first two essentially reflect the same behavior as their 5-day mean counterparts. The last three appear unsuccessful. In these latter cases, the actual 500 mb zonal flow was ill defined with a blunt, double westerly maximum.

C.L. BRISTON

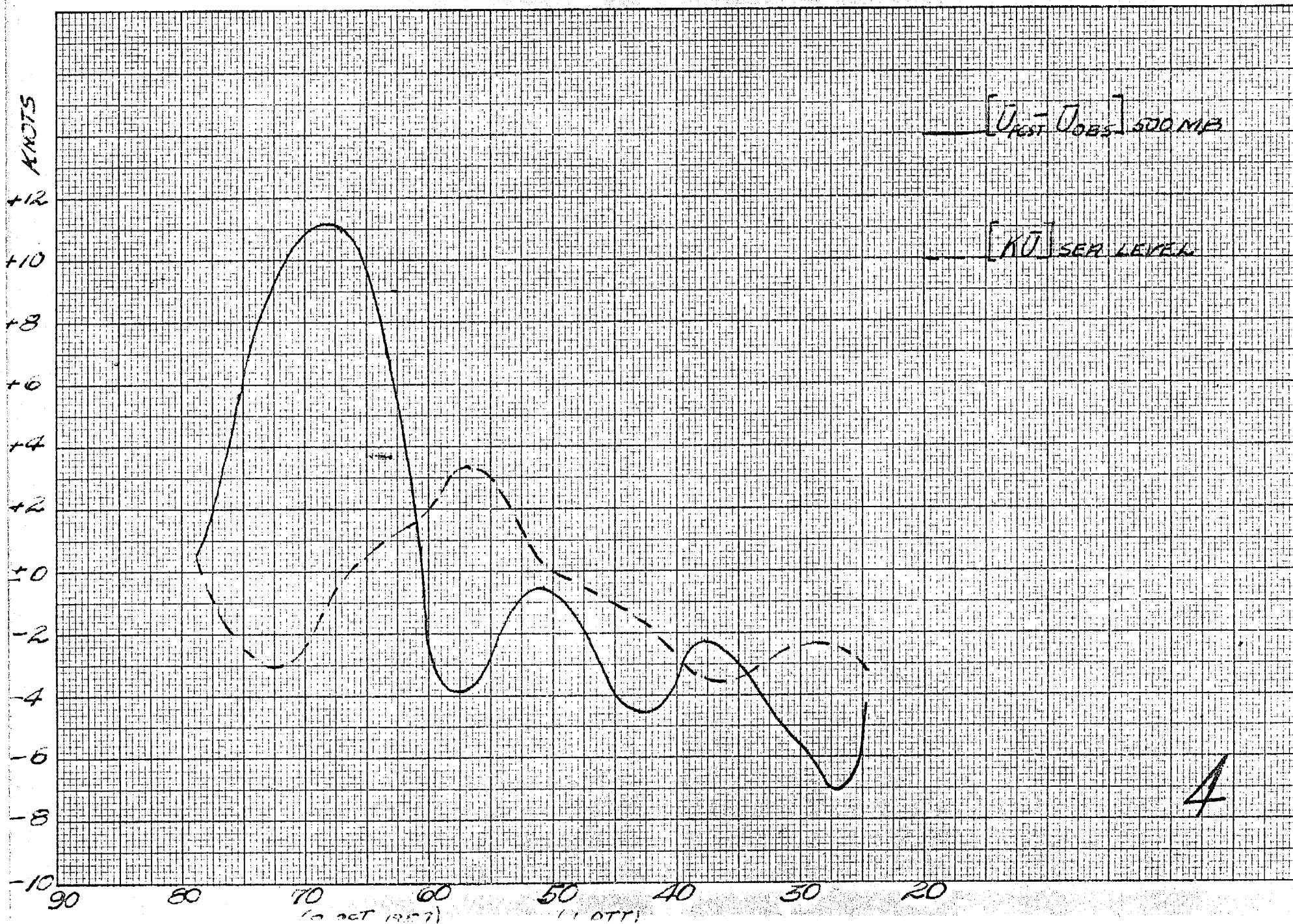




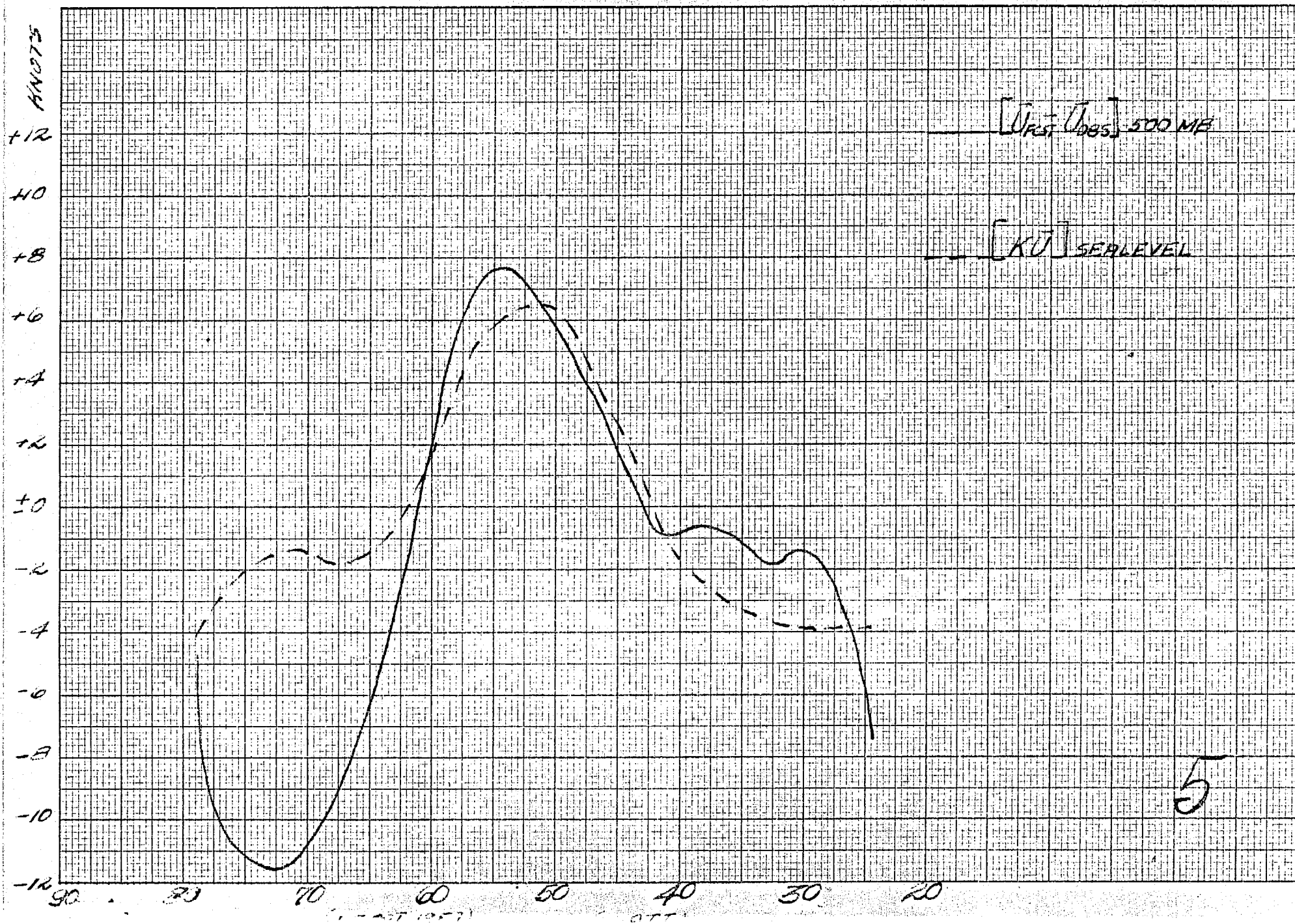
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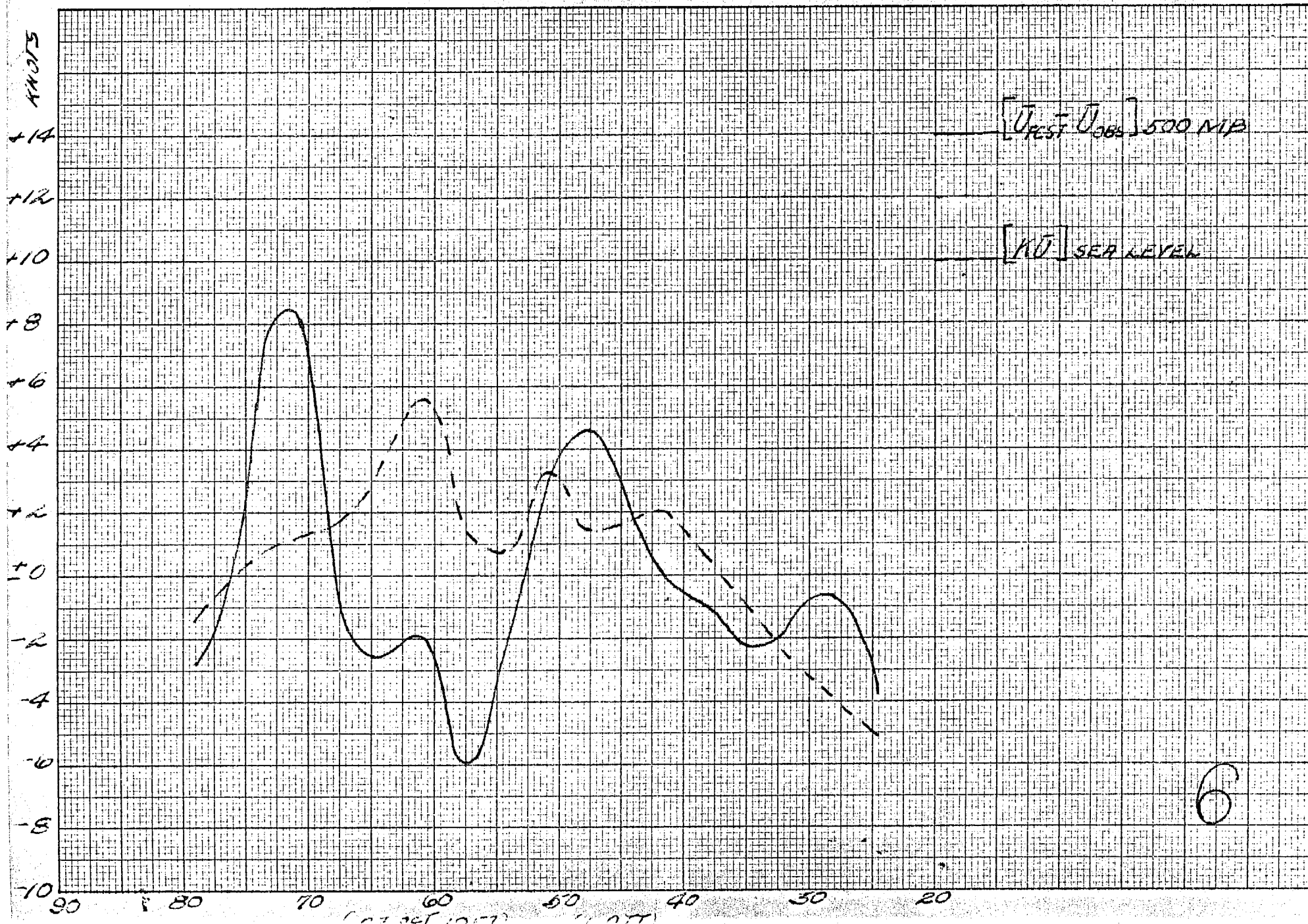
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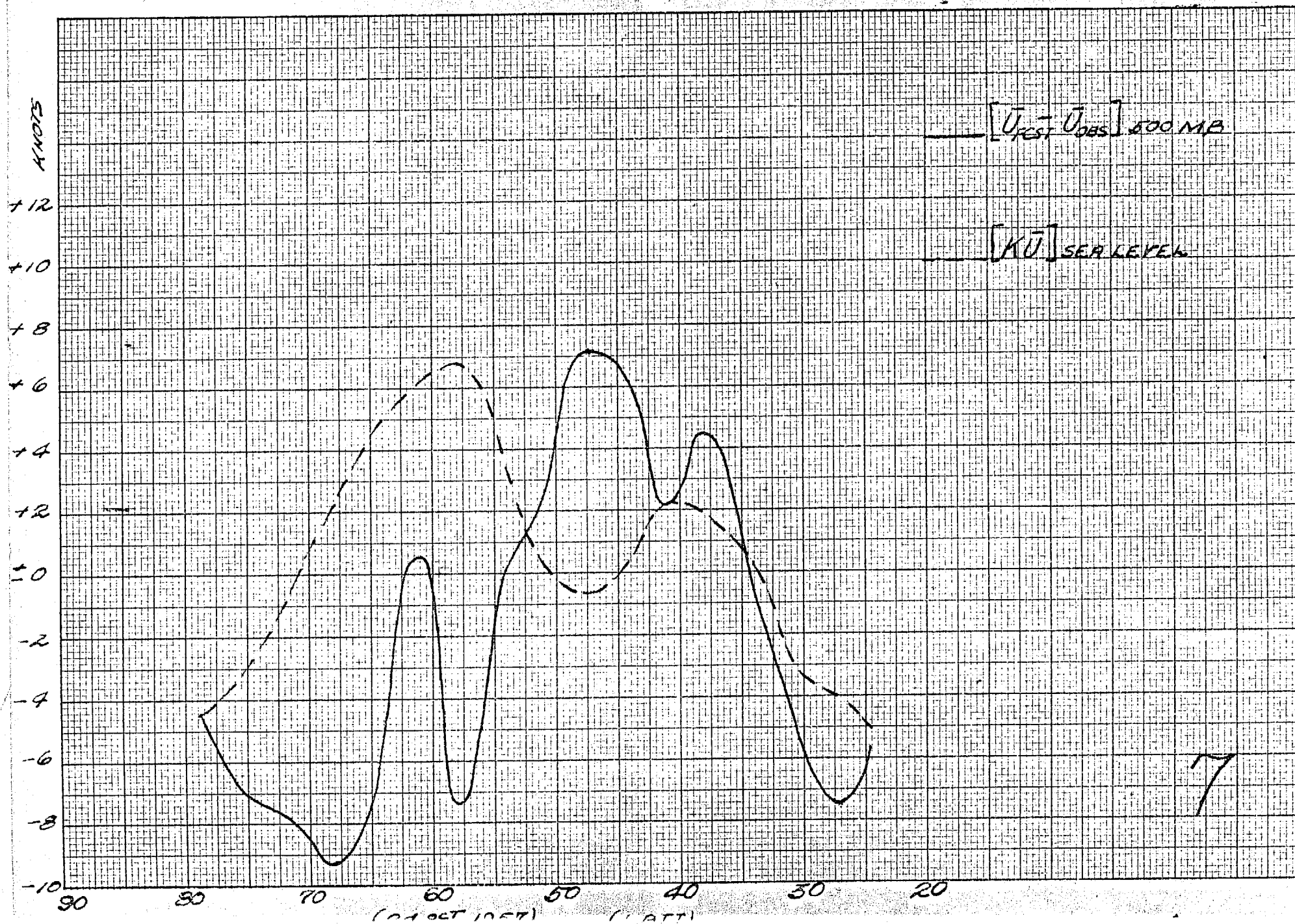








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